All four of the active companies are clearly attempting to segment their market by positioning multiple products that target specific market segments. GMER, PG&EES, and cleen 'n green, for example, each sell three products, each containing different resources and price premiums.[9] Similarly, Edison Source is also experimenting with a product line, including both a 50 percent and a 100 percent renewable product.

5.2 Pricing and Contracts

Billing: Edison Source, PG&E Energy Services, and Enron Energy Services offer consolidated billing. These marketers will bill for both their own energy charges and the utility distribution company (UDC) charges, and customers will receive only one bill for electric service. GMER, on the other hand, will only bill for energy-related charges, and customers will receive two bills, one from the UDC and one from GMER. Finally, cleen 'n green offers consolidated UDC billing, where the UDC bills for both the UDC charges and the marketers' energy charges.

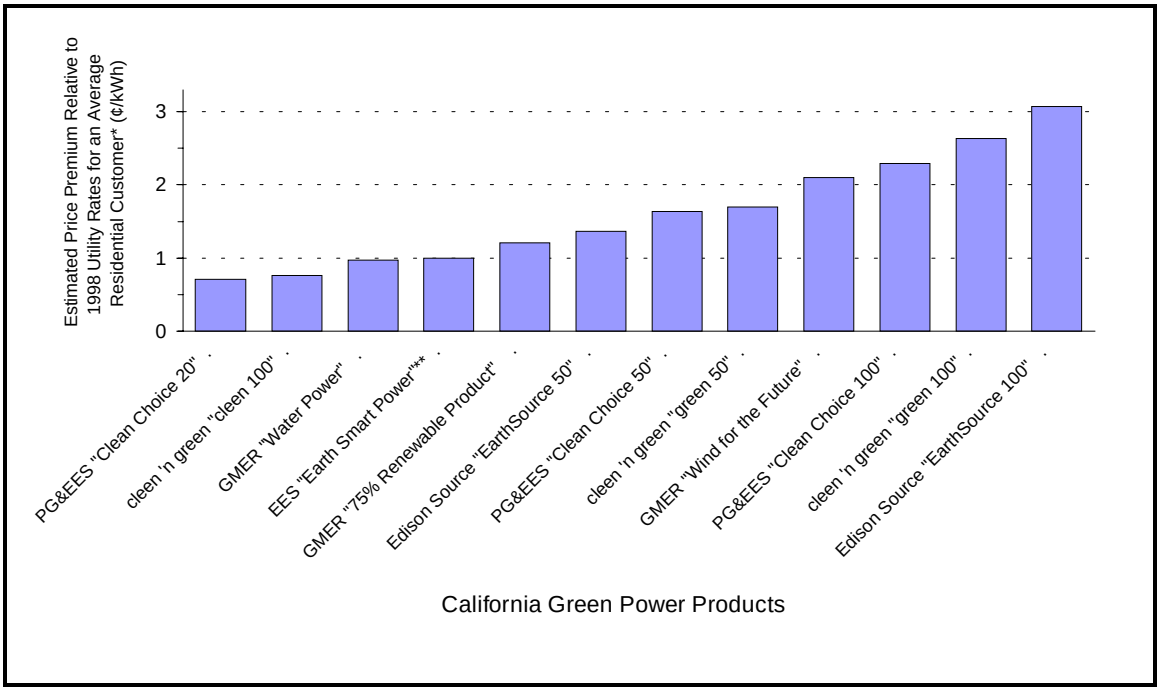
Actual Pricing Structure: The pricing structures for the green power products are shown in Table 3. GMER bases their energy prices on a fixed ¢/kWh premium over the power exchange (PX) clearing price. Because payment of stranded costs via the competition transition charge (CTC) is tied inversely to the PX clearing price, the "PX plus" rate structure allows GMER to offer their customers a fixed overall electric service rate (i.e., the combination of the GMER and the UDC rates results in a fixed overall rate). For their "75% Renewable" and "Water Power" products, GMER's rates are fixed for one year; the "Wind for the Future℠" product has a rate that is fixed for three years. Because they offer consolidated billing, Edison Source and EES both base their overall electric service rates as a premium over 1997 or 1998 utility tariffs. EES's rates are fixed for two years, whereas the prices for Edison Source's products are fixed only for 1998. Both PG&E Energy Services and cleen 'n green offer rate structures that combine fixed and usage-based fees, and the overall monthly premiums for these products are therefore less dependent on total customer electricity use. PG&EES's rate structures are fixed until May 31, 2000, whereas cleen 'n green's rates are fixed for one year.

Normalized Pricing Structure: Because terms vary, the actual pricing structures for these green power products are not directly comparable. Figure 2 therefore estimates and compares the price premiums of these products for an average residential customer relative to 1998 utility rates, ignoring discounts and other sign-up bonuses. Price premiums range from 0.71¢/kWh for the PG&EES's "Clean Choice™ 20" product to 3.07¢/kWh for Edison Source's "EarthSource℠ 100." This represents an overall electricity service price increase of

[9] For GMER's green power products, the least expensive product is not the one that is most popular. Specifically, as of March 6, 1998, news reports indicate that only 25% of GMER customers are selecting the "Water Power" product, whereas the other 75% are selecting one of the two more expensive power blends, "Wind for the Future℠" or "75% Renewable Product."

6.4 to 27.8 percent over 1998 utility rates, or $3.90 to $16.90 per month premiums for the average residential customer. However, because 1998 rates are ten percent lower than 1997 rates, the overall prices for some of the products are actually lower than the rates customers paid in 1997 for utility service.

Figure 2. Comparison of Residential Price Premiums Relative to 1998 Utility Rates



Notes: * The following assumptions were used to make these estimated price calculations: (1) PG&E 1997 rates of 11.589 ¢/kWh (baseline, Tier I) and 13.321 ¢/kWh (Tier II); (2) 1998 PG&E rates are 10% lower than 1997 rates; (3) average residential electric use = 6,600 kWh/year; (4) baseline (Tier I) quantities apply up to 11 kWh/day year-round. Actual prices and premiums may vary with total electricity use, utility service territory, county, etc.

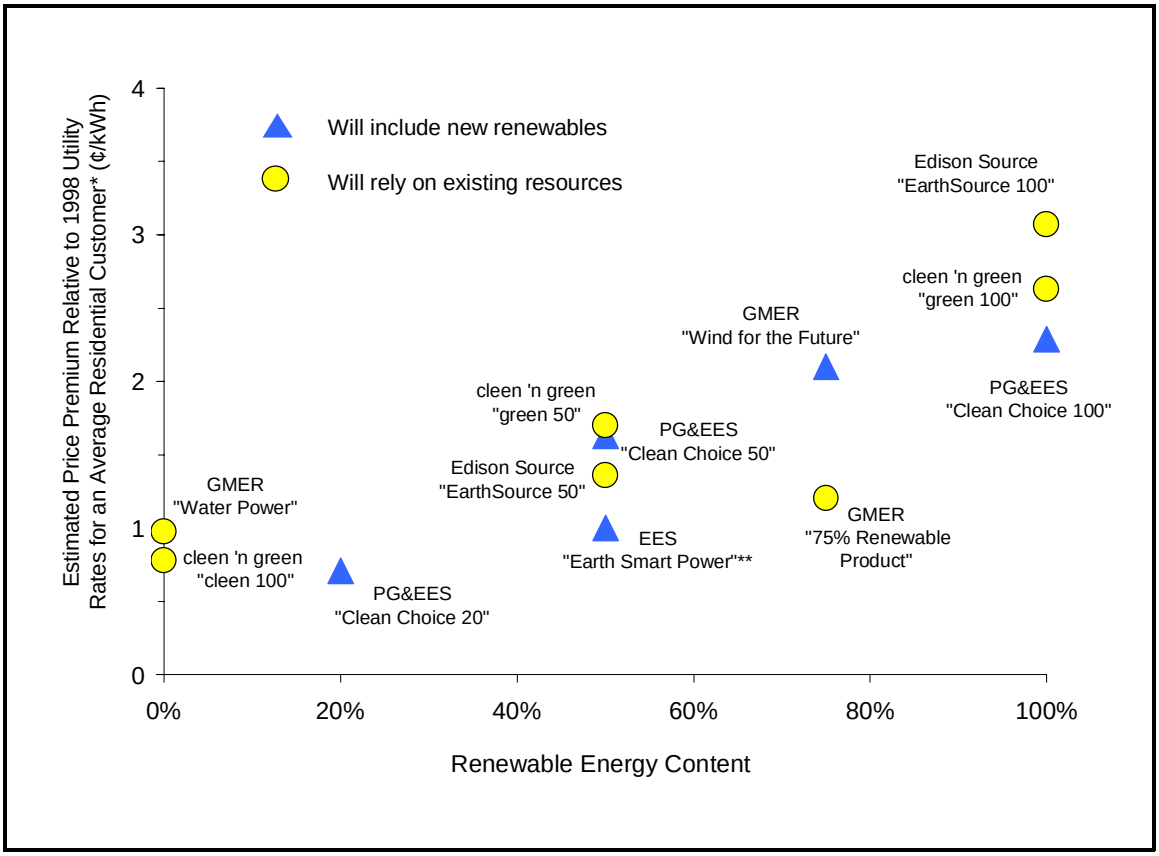
** EES no longer offers this product to new customers.

Figure 3 graphs these same price premiums as a function of renewable energy content, as defined by California state law. Because the most important metric for environmental comparisons may be the proportion of the product expected to come from new renewables, the figure also highlights those products for which commitments have been made to the supply of new renewable generation. The figure shows that prices generally rise in proportion to the fraction of the product coming from renewable electricity.

Overall, these green power premiums must cover customer acquisition costs, customer service expenses, business start-up costs and overhead, power supply costs, and profit. Especially in the early years of restructuring, when customer acquisition and start-up costs are high and can easily account for a 1¢/kWh premium, only a relatively small portion of the total premiums are likely to be spent on the incremental cost of renewable energy supply. Moreover, because of high acquisition and start-up costs, even the marketers admit that

current product pricing is skewed towards the high side of what market research indicates that customers are willing to pay (Renewable Marketers 1998).

Figure 3. Estimated Price Premiums vs. Renewable Content



Notes: * The following assumptions were used to make these estimated price calculations: (1) PG&E 1997 rates of 11.589 ¢/kWh (baseline, Tier I) and 13.321 ¢/kWh (Tier II); (2) 1998 PG&E rates are 10% lower than 1997 rates; (3) average residential electric use = 6,600 kWh/year; (4) baseline (Tier I) quantities apply up to 11 kWh/day year-round. D Actual prices and premiums may vary with total electricity use, utility service territory, county, etc.

** EES no longer offers this product to new customers.

Contracts and Fees: To encourage customers to switch suppliers, nearly all of the green products carry no early termination fees or contracts. Customers may therefore switch suppliers at any time for no added cost. Only GMER's "Wind for the Future[sm]" product includes a contract and early termination fee (specifically, it contains a three-year contract with a $25 termination fee).

5.3 Incentives and Bonuses for Sign Up and Participation

It is widely recognized in marketing that various forms of sign-up and participation incentives can be critical in both attracting and retaining customers. Many of the retail green power marketers are using such sales promotion tactics, which include price discounts, cash refunds, patronage rewards, free merchandise, point-of-purchase promotions, limited-time offers, and contests and sweepstakes. If a customer was willing to sign up with Edison Source before December 23, 1997, for example, that customer was entered to win a $2,500 Tournament of Roses Sweepstakes package. More recently, Edison Source has also offered two weeks of free electricity (excluding UDC charges) as a sign-up bonus as well as extra free weeks for referring friends and family members to EarthSource[sm]. As noted in Appendix A, other marketers are using similar tactics, but GMER has perhaps been the most innovative in attempting to add value-added features to their products. As sign-up bonuses, GMER has offered: (1) free beeswax candles; (2) limited offers of $10 or $25 off the 13th month electric bill; (3) free fleece jackets; and (4) free music compact discs. GMER has also designed their "ecocredits" program (under which customers can earn ecocredits for doing socially responsible activities that can then be used, in part, for discounts on environmental merchandise), to offer ongoing value to participating customers.

As opposed to sign-up and participation incentives, some marketers also expect to offer ancillary products and services for an additional cost. EES, for example, had planned to energy audits and various metering services packages for a fee offer to residential and commercial customers.

In the New Hampshire and Massachusetts retail competition pilot programs, a variety of energy-efficiency rebates, products, and services were offered to residential and commercial customers (either for a fee or as sign-up or participation incentives) (Holt and Fang 1997; Rothstein and Fang 1997). In California, on the other hand, energy-efficiency products and services have, at least thus far, played a minor role in the residential green product offerings,[10] perhaps because a wider variety of renewable resources are available in California or because energy efficiency appeals to different customer segments than renewable energy. Integrated renewable energy and energy-efficiency product offers may develop as the market matures, however. As noted above, Enron Energy Services had planned to offer its California residential customers energy audits for a fee, and GMER's ecocredits program has an energy-efficiency component. Foresight has also recently announced the launch of their Ecopower Home Products division, which will provide energy-efficient appliances and lighting, solar panels, and other energy equipment to retail customers. Foresight will also offer financing

[10] Energy management services are, however, playing a major role in the larger commercial, industrial, and institutional customer product offerings. Because it is extremely difficult to beat the PX wholesale price for commodity electricity, energy service providers have found that the provision of energy-efficiency and load-management services offer one of the only ways to reduce large-customer electricity bills.

options for these products. Other green power marketers have also expressed an interest in incorporating energy-efficiency products at a later date.[11]

[11] Though not integrated into a green power market offering, one of California's energy service providers, Commonwealth Energy Corporation, recently announced its plans to mass market an energy-efficient air conditioner device in the desert climates of California.

6. What Marketing Tactics Are Being Used?

Though direct access began on March 31, 1998, several of the green power marketers, including GMER, Edison Source, and EES, rolled out their initial marketing efforts in October and November of 1997 (for the planned January 1, 1998 market opening). Another flood of marketing by all of the major active green power marketers began shortly after the March 31st market opening.

Based on the marketer survey (including only the five U.S. retailers that supplied answers), the top advertising outlets in terms of total expected annual cost during the early years of restructuring include: direct mail, print ads, television, and telemarketing. Suppliers in California have employed all of these advertising media as well as radio spots, billboards, events, and customized web pages. GMER, Edison Source, EES, and PG&EES have all established significant direct mail campaigns, often purchasing mailing lists from environmental groups to target those customers who have previously shown an interest in environmental issues. Many of these companies have also purchased radio spots and print ads. GMER and Enron (before it withdrew from the market) have devoted significant resources to TV spots, and Edison Source ads have run on billboards across the state. Finally, Working Assets now promotes GMER's green power products to their own long-distance telephone customers, and GMER has a cross-promotional contract with Real Goods (and other retail stores) to co-market their products. Because they announced the launch of their products shortly before the market opened on March 31, PG&EES and cleen 'n green are only now rolling out their marketing efforts.[12]

To get a better feel for the tradeoffs in product design and marketing, one of the questions in the marketer survey asked the green power marketers to rate (on a scale of 1 to 5, where 1 is not at all important and 5 is extremely important) the importance of a number of product- and company-related factors in successfully marketing their green power products to residential customers. Ten of the U.S. marketers responded to this question, and Table 4 reports the results.

As can be seen from this table, some of the factors that appear to be the most important in successfully marketing green power include company recognition, the effectiveness of product-related advertising, the credibility of the company's message, the selling price of the product, and the renewable energy content of the product. Customer-sited renewable energy applications, offers of ancillary products and services, and the perceived reliability of the power supply were deemed least important.

[12] Some of the expected entrants into the green power market are likely to use less traditional advertising and marketing strategies. UtiliSys/Keystone Energy Services, for example, intends to use network, affinity, and agent-based marketing techniques, each of which relies more heavily on individual customer contact.

Table 4. Factors in Successfully Marketing Green Power to Residential Customers

Factors in Successfully Marketing Green Power to Residential Customers	Mean Score on Importance Scale
Company recognition and brand identification	4.6
Effectiveness of product-related advertising	4.5
Credibility of company's message	4.5
Selling price of product	4.2
Renewable energy content of product	4.2
Exclusion of nuclear and coal power	3.8
Incentives and bonuses for customer sign up and participation (e.g., rebates, gifts, etc.)	3.4
Recognized corporate environmental commitment of marketer	3.3
Inclusion of "new" renewable energy projects	3.3
Air emissions of product	3.1
Perceived reliability of power supply	3.0
Offers of additional ancillary products and services for a fee (i.e., billing and payment options, efficiency services)	2.6
Customer-sited renewable energy applications (PV, wind, etc.)	2.0

Many of the retail green power products and marketing strategies being used in California are consistent with the results presented in Table 4. For example, many of the green products are being differentiated almost strictly based on renewable energy content and the exclusion of coal and nuclear power, consistent with the relative importance of these variables compared to other environmental differentiation techniques. The air emissions of the product and the inclusion of new renewable facilities are generally viewed as less important, and these two areas of differentiation are not as prevalent as direct renewable energy content in California. Nonetheless, it should be noted that the rated importance of these two additional factors is quite variable across marketers (for example, some marketers believe that the inclusion of new renewables is essential, whereas others feel that it is not particularly important in marketing to residential customers), and several marketers do use these variables as primary or secondary modes of differentiation. Finally, though Foresight has plans to do so in the future, no major marketer is currently offering customer-sited renewable products, consistent with the low perceived importance of this variable.

A review of advertising material shows that frequently used marketing themes by the retail green power marketers in California are also consistent with the results presented in Table 4. Common themes include: (1) the low risk of switching and the absence of contracts, switching fees, and early termination fees; (2) the effectiveness and ease of individual action in protecting the environment and the power to choose suppliers; (3) the environmental benefits

of the renewable-based products and the independent certification of these benefits by the Green-e certification program (see Section 8); (4) sign-up and participation bonuses to elicit switching; and (5) reminders that customers do not have to sacrifice reliability when selecting a new electricity supplier. The retail green power marketers also frequently emphasize the low incremental cost of their green power products and, because all residential and small commercial customers received a ten percent rate reduction on January 1, 1998, some marketers have compared their prices with 1997 utility rates, not the lower 1998 rates.
The results provided in Table 4 also demonstrate the need not only for product-specific marketing but also for corporate recognition and credibility. Therefore, in addition to product-specific marketing, most of the retail green power marketers have also attempted to build their corporate image and establish the environmental commitment of their companies, often touting corporate environmental awards and achievements, the personal commitment of employees, and charitable donations. Though none of these companies have formal alliances with environmental groups, each has worked informally with such groups in designing products and marketing strategies.

Though some general marketing trends are emerging, it is important to recognize that early marketing strategies may differ from later ones because emergent markets are often characterized by low sales, high advertising costs, negative profits, and market experimentation. In the early stages of market development, marketers are often attempting to build awareness and frequently use heavy sales promotion to entice product trial. Indeed, the California green power marketers in aggregate have reportedly committed an estimated $125 million to the development of the green power market and have already spent $40 million of this on initial marketing and business start-up costs (Renewable Marketers 1998). Moreover, during the three-month period spanning April through June 1998, the green power marketers in California expect, in aggregate, to spend $50 million on advertising (Blunden 1998). Due to these high start-up and advertising costs, and based on news reports and informal conversations with marketers, signing up an average residential customer in the early years of restructuring may easily cost over $200. On a longer-term basis, sign-up costs of perhaps $100 per customer can be expected, which is consistent with other consumer marketing industries (Renewable Marketers 1998). Residential marketing is clearly a very costly proposition which is one of the key reasons for the proliferation of premium green power products and the dearth of low-price product offers for the residential customer class.

Finally, it should be noted that there has also clearly been a significant amount of market testing taking place. GMER, for example, has undertaken substantial market research via a field test of different types of direct mail and sign-up incentives, and EES field tested a number of different pricing strategies for their green product. As the market stabilizes over time, products and marketing strategies can therefore be expected to evolve and increase in effectiveness.

7. How Is the Green Power Market Impacting Renewable Generators and the Environment?

It is far too early to assess the strength of customer demand for green power and its impact for renewable generation and the environment. As noted earlier, however, the role of renewable electricity in the green product offers has been strong thus far, with most of the green products containing significant quantities of renewable electricity and with renewable energy content being the primary mode of green product differentiation. Only two of the twelve products that have been or are being differentiated based on green claims contain no renewable energy as defined by California state law (both of these products emphasize large hydropower and/or natural gas generation). Averaged over all of the green power products, renewable energy makes up 55 percent of the green product offers.

Given average green power products that consist of 55 percent renewable energy (with an average 50% capacity factor), a two percent residential market penetration of these products, and assuming that 75 percent of all renewable energy sales go to the residential customer class, approximately 200 MW of renewable energy could be supported by the California green power market. During the early years of restructuring, this seems a plausible estimate of the total amount of renewables likely to be supported by green power demand. Over time, using these same assumptions, but with a ten percent residential market penetration, 1,000 MW of renewable energy could be supported. These estimates suggest that green power demand could play a consequential, though perhaps not overwhelming role in supporting renewable energy generation.

Nonetheless, many of the green power products currently offered rely almost exclusively on existing resources, and there is concern that these products are simply reshuffling existing renewable generation and are not having an immediate and meaningful impact on the overall supply of renewable energy or the environment. In addition, most of the existing renewable generation is being purchased from investor-owned and municipal electric utilities. Given that the costs of these renewable facilities would have been recovered from ratepayers even absent the sales to green power marketers, environmental and consumer protection organizations have questioned whether these purchases result in any net environmental benefit or in net increases in renewable generation. Moreover, because electric utilities have access to ratepayer funds, they will typically be able to sell their renewable energy at a lower price than companies that do not have access to ratepayer-funded renewable resources. While these concerns are certainly legitimate, the marketers hope that, over time, demand will be significant enough to drive the construction of new renewable resources, which provide more obvious near-term environmental benefits. In addition, to the extent that customer demand for green power helps existing facilities remain in operation, then that demand is having an immediate impact on overall renewables supply.

All of the green power products in California include a substantial fraction of existing resources. Moreover, seven of the 12 products make no strong, near-term commitment to include new renewable energy, and these products therefore rely almost exclusively on

existing resources (both eligible renewable and large hydro). While there is a significant amount of existing renewables generation in California, the vast majority of it is either: (1) tied up in long-term contracts with the electric utilities; or (2) owned by the three major investor-owned utilities and therefore not accessible to the green power market in the near term. The CEC has estimated that only 505 MW of existing, non-utility renewable capacity is potentially available to the green power market in 1998 (CEC 1997). A large fraction of this capacity is not currently operating, however, and much of the capacity may be uneconomic even with current green power premiums. More conservatively, the Independent Energy Producers Association estimates that fewer than 200 MW of non-utility capacity is available in 1998, and it appears as if much of this supply is relatively costly and/or would require a longer-term purchase commitment by the green power marketers than many marketers are willing to provide at this early stage of market development.

Because the three large, in-state, investor-owned utilities are required to sell into and purchase from the power exchange, they are not allowed to sell their renewable energy to marketers. Nonetheless, it appears as if there are perhaps 150 to 300 MW of readily available, in-state, municipally owned renewable resources (in addition to out-of-state utility-owned resources) that could be sold to marketers at a small premium over the PX price (e.g., less than 0.5¢/kWh premium) and with flexible purchase terms (e.g., short contract length, flexible delivery shape, and indexed pricing structure). This is a sufficient quantity of resources to supply the green power market for several years. As a result, despite the government-provided incentives available for using in-state, non-utility renewable generation (see Section 8), and the potential availability of some non-utility renewables capacity, most marketers have found it more cost effective to secure existing renewables supply from out-of-state and/or in-state electric utilities (Renewable Marketers 1998). As noted above, there are concerns over whether such products provide net environmental benefits or increase the overall level of renewables supply in the near term.

The purchase of new renewable generation is likely to require a much larger premium than that for existing renewables. Nonetheless, five of the 12 retail green power products have made specific commitments to include new renewable generation (making up 5-25% of the product content) by, at the latest, the end of 1999. Specifically, GMER promises its customers that a new wind turbine will be installed for every 3,000 customers of its "Wind for the Future[sm]" product, and all three of PG&E Energy Services' products are to include new renewable electricity within 12 to 18 months. Given their initial commitment to develop new wind projects, EES also appears to have some responsibility to supply new renewables to those customers who signed up prior to the company's suspension of its residential marketing activities. Finally, though they have not committed to supply a specific portion of their power from new renewables, Edison Source and cleen 'n green both have plans to include some new renewables in the future in four of their product offerings. Overall, then, nine of the 12 products (or eight of 11 products if one excludes EES) provide varying levels of commitment to the supply of some new renewable generation and the attendant environmental benefits.

The California green power marketers often emphasize solar and wind energy in their advertising, presumably because of the broad public appeal of these resources. Nonetheless, no single type of renewable generation is clearly dominating the market for green sales. Of the existing resources, hydropower, geothermal, and biomass are most popular. The inclusion of new wind facilities in both GMER's and Enron's product offers, however, demonstrates both the relative cost effectiveness and appeal of wind power as a green resource for the future. Because of its cost, direct use of solar energy has not played a major role in the product offers to date, though Edison Source has plans to build a small PV facility.

One key factor from a generator's perspective is the length of power purchase contract being offered by marketers. Based on the marketer survey, it appears likely that generators will no longer be able to rely on long-term purchase contracts. When asked the length of contracts that are likely to be signed with *existing* renewable generators over the next two years and in five years, the nine marketers responding to the question almost uniformly stated that contract lengths with a maximum of two years can be expected. The marketers did recognize that *new* renewable energy facilities would require longer-term contracts, but there was great variability in expected contract terms, perhaps reflecting the immaturity of the market. Approximately half of the marketers suggested that over the next two years, contract terms would be three years or less for new projects, whereas the other half indicated that contracts of up to 10 to 15 years could still be expected. Nonetheless, the majority of marketers (6 out of 8) indicated that in five years, contracts of one to five years would become the industry standard for new renewable projects.[13]

[13] Some of the green power retailers are not sufficiently capitalized to finance a new facility or absorb the risk that a long-term commitment would require. The green power wholesalers are therefore expected to act as "shock absorbers" in the new market, and will be more willing to sign longer-term contracts with new projects.

8. The Impact of Non-Market Actors

The success of retail markets for green electricity will depend not only on the actions of private market actors, but also on the detailed market rules established at the onset of electricity industry restructuring and on a variety of governmental, nonprofit, and private efforts intended to facilitate the market. It is therefore important to recognize that the emergence of the green power market in California has been and will be strongly influenced by the efforts of state policymakers, regulators, and nonprofit groups.

At least four different sets of facilitation efforts have been or will be of critical importance: (1) California's surcharge-funded renewables policy; (2) provisions that require the disclosure of fuel mix to retail customers; (3) Green-e certification of green power products; and (4) the establishment of a variety of "market rules" that have created an environment suitable for the sale green power products.

Though generators, marketers, and customers are impacted by all of these efforts, Table 5 identifies the direct beneficiaries of these various programs. The programs themselves are discussed in more detail below. There has been, as one might expect, significant debate as to the relative merits of the various forms of policy support. The intent here is not to evaluate these claims, but to instead highlight briefly the impact each program is having or is expected to have on the development of the green power market. A significant area of future research will be to evaluate the relative importance of these programs in more detail.

Table 5. Market Facilitation Efforts

		Direct Beneficiary		
Program	**Administrator**	**Generator**	**Marketer**	**Customer**
Renewables Policy	California Energy Commission			
• Existing facilities		✓		
• New facilities		✓		
• Emerging technologies		✓		✓
• Customer incentives			✓	✓
• Customer information				✓
Fuel Source Disclosure	California Energy Commission		✓	✓
Green-e Certification	Center for Resource Solutions		✓	✓
"Market Rules"	California Public Utilities Commission	✓	✓	✓

8.1 Surcharge-Funded Renewables Policy

Since the California Public Utilities Commission (CPUC) initiated the restructuring of the state's electric industry in 1994, there has been a vigorous and contentious debate about the desirability of supporting renewables and the appropriate mechanisms with which to promote these technologies in a restructured industry (Wiser *et al.* 1996). In its restructuring legislation of 1996, California ultimately chose to establish a four-year, $540 million surcharge-funded renewables program to be administered by the California Energy Commission (CEC).

Instead of relying on any single distribution mechanism, the legislature adopted multiple approaches as shown in Table 5. Though exceptions and exclusions exist, support will generally be provided to existing in-state, non-utility facilities through production incentives ($243 million), to new in-state, non-utility facilities via an auction of five-year production incentives ($162 million), to higher-cost, "emerging" in-state technologies via capital cost buy-downs ($54 million), and to retail marketers that sell in-state, non-utility renewable electricity via sales-based customer incentives ($75.6 million). Another $5.4 million will be used to help educate Californians about green power. (See CEC 1997; 1998 for additional details.)

Each of these programs is expected to have a positive impact on the development of the customer-driven green power market over the four-year transition period. Though funding is limited, the customer education program will help inform customers about their green power options and the benefits of renewable electricity. More importantly, the production incentives provided to new and existing in-state, non-utility projects (which may be as high as 1.5¢/kWh), and the capital cost buy-downs for emerging technologies, will allow renewable energy to be sold at a reduced price to green power marketers and therefore ultimately to customers. Finally, the customer incentives for in-state, non-utility renewable energy sales may directly reduce the price of renewable-based retail electricity products even more (the credit is set at 1.5¢/kWh for the first six months of the program). Combining the upstream generator incentives with the downstream marketer/customer incentives results in an expected cost buy-down of up to 3¢/kWh for in-state, non-utility retail renewable energy sales.

As noted earlier, however, despite these incentives many marketers have, somewhat surprisingly, found it more cost effective to purchase renewable energy from out-of-state and/or from in-state electric utilities and therefore forego these incentives. Nonetheless, absent these incentives, the price of some of the green power products would be higher and the market for green sales in California would be less profitable for marketers and generators. Moreover, by helping define what resources are considered to be renewable and by providing incentives to those resources, the program has likely had an impact on the fuel mix of the green power products being offered. Funding for these programs is currently slated to end after the four-year restructuring transition period. Over the long term, then, a key question is whether these funds will constitute seed investment that will help the renewables industries

and green power market flourish even after funding is removed, or whether the funds will offer only a four-year window of market opportunity.

8.2. Disclosure of Fuel Mix

The provision of information is recognized as an important ingredient in the development of competitive product markets and private firms do not always have sufficient incentives to provide accurate, reliable, comparable information on product offers. Indeed, amid the rush of businesses to engage in environmental marketing in the late 1980s and early 1990s, there were increasing concerns over the truthfulness of green claims (Fierdman 1991; Kangun *et al.* 1991; Polonsky 1995; Carlson *et al.* 1995). As witnessed in the New England retail competition pilot programs, customer confusion, vague marketing claims, and "apples and oranges" comparisons add significant transaction costs and may limit the potential for efficient competition in the market for power products generally, and green products specifically.

Because of these factors, legislation was passed in California (SB 1305) requiring electricity suppliers, as of January 1, 1998, to provide their customers with fuel source information on a uniform, regular basis (though the law took effect January 1, the format and content of the fuel source label is not expected to be finalized until the summer of 1998). Mandatory disclosure and labeling of fuel mix of this type was viewed as a critical element of a successful green power market and is expected to facilitate the comparison of competing green claims (Holt 1997; Moskovitz *et al.* 1997; Levy *et al.* 1997). Based on the marketer survey, nearly all green power marketers are in favor of some form of mandatory disclosure, and fuel source disclosure is consistently viewed as more important than emissions and pricing disclosure requirements. It is therefore expected that the California legislation will both aid customer choice and customer protection, as well as facilitate the market for green power sales.

8.3 The Green-e Program

Mandatory disclosure regulations are not the only way to help protect customers who want to purchase green power products and marketers who intend to sell such products. Another complementary approach is to develop a certification program. Though the effectiveness of various forms of product labeling has been debated (Menell 1995; Dyer and Maronick 1988; Harris and Casey-McCabe 1996; Abt Associates 1994), and certification programs are not uniformly hailed (Energy Center of Wisconsin 1997), environmental certification programs are increasingly seen as one of several non-regulatory tools to achieve environmental objectives (Modl 1995). Ideally, certification programs can help inform and influence product purchases and spur suppliers to compete in offering environmentally preferable products (Abt Associates 1993). By making information more available, visible, and understandable, environmental certification programs seek to overcome problems associated with access to information and reduce the prevalence of false and/or misleading advertising.

Led by the nonprofit Center for Resource Solutions (CRS), green power marketers and environmental and consumer advocates in California gathered in early 1997 to design and later launch a green power certification program, called the Green-e Renewable Electricity Branding Project. (See Rabago *et al.* 1998 for more details on the Green-e program.) The Green-e Program is voluntary and is designed to educate the public about the benefits of renewable energy and to provide a means by which electricity customers can easily identify renewable-based electricity products that meet the program's technical standards. The Green-e brand, like the recycling logo and other certification marks, offers customer a way of quickly identifying electricity products certified under the Green-e Program. The brand itself is backed by a marketer code of conduct, by disclosure standards, by a verification program, and by a coordinated public education campaign.

To use the Green-e brand in California, electricity products must meet or exceed standards for renewables content (50% renewables meeting the same definition as California state law), emissions (lower than system power), and nuclear content (no differentiated nuclear). In the near future, additional, stricter requirements will be imposed, including a standard for the inclusion of new renewable energy. Though certification proceeds on a product-by-product basis, marketers must also meet additional requirements that ensure professional and ethical conduct, including contract, pricing, and fuel source disclosure regulations, and environmental marketing guidelines. While some have criticized the certification standards created by the Green-e in California, the program was designed to create a minimum threshold for a credible and meaningful green power product, with the intent of establishing stricter standards over time and encouraging other organizations to impose more stringent endorsement criteria. Using more stringent requirements, for example, the Natural Resources Defense Council has endorsed a segment of the Green-e certified products. In addition, American Rivers has released more stringent draft criteria for environmentally responsible hydro projects, and the American Wind Energy Association has released a set of strict green marketing principles that detail requirements for meaningful green power products.

The impact of the Green-e on customers and marketers has not been formally assessed. Anecdotal evidence, however, as well as responses to the marketer survey, suggest that the Green-e has already had a positive impact on the environmental attributes of the green products being offered in California. To date, nearly all of the retail and wholesale green power marketers active in California have at least one product certified by the Green-e Program. Of the retail green power products listed in Table 3, all but GMER's "Water Power," PG&EES's "Clean Choice™ 20," and cleen 'n green's three products are certified by the Green-e. Early in the program definition stage, many marketers expressed concern that they could not meet the 50 percent renewable threshold requirement and still have a competitive product. Nevertheless, of the eleven retail and wholesale products certified so far, all offer at least 50 percent renewables supply and several provide 75 or 100 percent renewables. While it will take time and significant expenditure of funds for customers to become acquainted with the Green-e brand, marketers are already evoking the Green-e in their advertising.

The marketer survey asked participating marketers whether the Green-e has helped them define their green power products and marketing strategies. Though the possibility of strategic response should be acknowledged, of the five marketers that responded (out of six marketers that have products certified by the program), four claim that, by establishing minimum standards for green products, the Green-e program has helped them define their green power products and marketing strategies. Only one marketer indicated that the Green-e has not had an effect on product design.

8.4 Market Rules

As is increasingly recognized in economics, institutional and transactional rules impact the operations of all markets, and can be particularly important in the development of emerging markets. As another component of our marketer survey, we evaluated the views of the green power marketers on the impact of market rules on the development of competitive electricity markets broadly, and green power more specifically (see Wiser *et al.* 1998 for detailed results). As is demonstrated by this work, marketers believe that a number of market rules will prove critical for the development of the green power market, ranging from the unbundling of billing services and the design of transmission pricing systems to customer education programs and the timing of direct access. Ten of the 12 marketers responding to the survey believe that regulators and legislators are not adequately considering the impact of these various market rules on the green power market. In California, some of the key areas of concern voiced by the marketers include: (1) low retail margins because marketers must compete at retail with a wholesale default utility service cost (i.e., the PX); (2) limited unbundling of the costs of billing and other revenue-cycle services; (3) ineffective use of customer education funds; and (4) limitations on the customer-incentives to in-state, non-utility renewable project sales and not out-of-state renewable purchases or in-state purchases from utilities.

On the other hand, several market rules (beyond the renewable subsidies and disclosure regulations) are intended to benefit renewable energy and green power sales. For example, customers in California will be given the option to support renewable energy through their default utility service provider (note that most green power marketers oppose this rule because it provides customers a way to support renewables without switching electric providers). Moreover, customers who intend to purchase over 50 percent of their electricity from renewable energy sources will be given priority in direct access processing if bottlenecks occur. Though the CPUC-directed customer education program has been criticized, that broad-based customer education program, combined with renewables-targeted educational efforts by the CEC, the Center for Energy Efficiency and Renewable Technologies, CRS, and Renewable Energy Marketing Board are likely to increase public awareness of retail choice and renewable energy. Finally, as noted earlier, it is in part because of the market rules (i.e., a low utility default service price and uncompensated unbundling of revenue-cycle services) that green power products have emerged in California's residential electricity market whereas low-price product offers are far less common.

9. Early Lessons and Future Prospects

It is too early to make robust conclusions regarding the strength of customer demand for green electricity or the effectiveness of green power marketing in supporting renewable energy. Nonetheless, some initial lessons and insights from the California experience are offered here.

- ***The size of the green power market in the near term will be limited, but its ultimate size is still uncertain.*** Demand for green power products during the first couple years is expected to be modest (perhaps on the order of 1-4% of residential customers), primarily because most residential customers are unlikely to switch suppliers. Ultimately, the marketers in California expect the green power market to be robust, but it will clearly take time for the market to develop. One cannot yet reliably extrapolate current market trends to predict the success of green power marketing in encouraging renewable development.

- ***The green power market is fragile and industry consolidation is possible if customer demand is lower than expected by year's end.*** Many of the green power marketers have already committed significant resources to the market. Though it is still early, if anything, customer demand for green power specifically, and customer switching in general, has been lower thus far than expected. Unlike EES, most of the marketers are likely to continue operations and evaluate their strategy after a year or so when more robust results are available. These marketers do not have unlimited patience, however, and industry consolidation is possible if customer demand is lower than expected by year's end.

- ***Residential customers are the primary market for green power.*** Though commercial customers offer an important market for green power, green power marketers clearly believe that the residential customer class is the most promising, and will account for perhaps 75 percent of all revenue from retail green power sales.

- ***Marketers that target the residential customer class are very interested in pursuing green power marketing and customers have a large number of green products to select from.*** A number of marketers are engaged in green power marketing in California, though the targeted customer segments, degree of vertical integration, organizational affiliations, and scope of the product line differ. Because of the high cost of marketing to residential customers and the low expected utility default service cost, it is difficult to turn a profit when competition is based on price alone. As a result, few residential marketers offer price-based residential electricity products. Instead, most of the companies offering service to residential customers are differentiating themselves based on greenness, thereby allowing higher prices and profit margins.

- ***Renewable energy has been the primary basis for green differentiation, but the green power products rely largely on existing resources purchased from electric utilities.*** Most environmental differentiation in California has been based on the renewable energy content of the electricity products. The green power products being offered are not all of equal quality, but many rely heavily on existing resources purchased from electric utilities. There remain legitimate concerns over whether such products provide net environmental benefits or increase the overall level of renewables supply in the near term. Moreover, two of the green power products rely almost exclusively on existing large hydro facilities.

- ***At least some of the green power marketers include meaningful commitments to new renewable energy generation in their product offers.*** Though the inclusion of existing renewable resources has been a primary mode of green differentiation, many of the retail green power products include varying levels (5 to 25%) of new renewable generation. If robust customer demand materializes, even larger commitments can be expected. In part because of these commitments, the environmental quality of at least a portion of the green power products in California is good, especially when compared with the New England pilot experience where even existing renewables played a minor role in the product offerings.

- ***The price for green power is moderate.*** Marketing to residential customers is very costly. As a result, though the green power premiums are not exorbitant, they range from 0.7¢/kWh to over 3¢/kWh above 1998 utility rates, only a fraction of which flows through to the renewable generator. In a restructured electricity market, states without renewable energy incentives can expect either higher premiums or green products with fewer environmental benefits.

- ***No single type of renewable generation or vintage will dominate the market for green sales in the near term.*** In California, multiple green products exist, each with a different mix of renewable resource types, vintages, and location. No single type of renewable generation is clearly dominating the market for green sales and, though the use of existing renewable resources is dominant, electricity products that include new facilities have also developed. In all cases, however, the renewable generator can expect much shorter and more flexible contract terms than those available historically.

- ***A period of experimentation can be expected.*** In the first years of restructuring, a period of experimentation with respect to product design, pricing, and marketing strategies can be expected. Therefore, products and strategies can be expected to evolve and increase in effectiveness over time.

- ***A wide variety of sign-up and participation incentives and ancillary products and services are being offered.*** In order to provide concrete value to customers and to offer strong incentives to switch suppliers, a variety of sign-up bonuses and ancillary products and services are offered by green power marketers, and most products carry

no contracts or early termination fees. Thus far, energy-efficiency products and services are playing a minor role in the green power offers, but profitable areas of integration between energy efficiency and renewable energy are being explored.

- ***Customer education is critical.*** Most residential customers are not accustomed to making decisions about their electricity supply and will not be immediately aware of the opportunities that restructuring presents. Without effective educational efforts, by both marketers and public agencies, many residential customers may be leery of the potential benefits of restructuring and will be reluctant to exercise their choice of electric service providers. In California, marketers are concerned that the publicly funded customer education efforts to date have not been particularly well managed.

- ***A green power certification program can improve the degree to which green products provide environmental benefits, enhancing the credibility of the market as a whole.*** Environmental and consumer advocates should push marketers to improve their green power product offers and marketing programs. Because the Green-e certification program was established through a collaborative process among environmental advocates, consumer interests, and green power marketers that convened before direct access began, many marketers used the guidelines established by the program as a guide in product development and marketing design.

- ***The green market in California did not appear accidentally, but was bolstered by public policy.*** In California, the $540 million renewable program (including incentives directed to marketers of green power), the specific market rules developed as part of the restructuring process, the fuel source disclosure requirements, and the customer education campaigns have combined to lay the groundwork for what could be a credible and sizable green power market. Because customer preferences are not yet well defined, the early development of the green power market will be crucial for its long-term success and public policies can play an important role in shaping the nascent market. Therefore, designing an effective interface between private-sector green power marketing activity and government-funded renewable energy support programs is essential.

There remain legitimate concerns over the near-term viability of green power marketing to support significant quantities of renewable energy and provide large environmental gains. First, interest in green power is expected to be largely, though not exclusively, confined to the residential sector. Second, the high cost of marketing green power will necessarily restrict customer demand and/or reduce the environmental quality of many green products. Third, some marketers will find cheap ways of greening themselves (e.g., large hydropower, existing renewables, etc.) without making meaningful incremental contributions to renewables or the environment. Fourth, many customers may not be altruistic enough to pay for public environmental benefits that everyone will enjoy. Finally, actual customer demand for green power to date has been far lower than that suggested by customer surveys of purchase intentions. These concerns suggest that renewable energy programs and policies, both to

support and augment the green power market, may be warranted (Rader and Short 1998; Wiser *et al.* 1997; Wiser and Pickle 1997).

Despite the concerns raised above, we believe that green power marketing, if implemented appropriately and supported by well-designed public policies and facilitation efforts, can create real opportunities for renewable energy and make meaningful contributions toward environmental improvements. The emergence of the green power market in California has, thus far, been more successful in terms of product quality and marketing credibility than many expected based on experience with the New Hampshire and Massachusetts pilot programs. The size of the direct access market, the level of existing renewable generation, and a number of governmental and nongovernmental facilitation efforts have all improved the prospects for green power marketing in the state. Though there are still some legitimate concerns and large uncertainties surrounding the green power market, for other states embarking on electricity restructuring and for renewable energy advocates, the early results presented in this paper are promising. Nonetheless, one must recognize that California has a market environment and a set of public policies and market rules that, while not perfect, are more conducive to green power marketing than many other states. In fact, because of the high cost of servicing residential customers and the low utility default service price, green power marketing offers one of the only entrees to California's residential marketplace in the near term. Finally, despite these promising early results, it is important to acknowledge that the green power market is still young, that the market will clearly take some time to develop and mature, and that the overall strength of customer demand for green power products, and therefore the ultimate impact of green power marketing on renewable energy and the environment, remains highly uncertain.

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